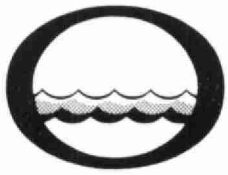
1970 OPERATING SUMMARY

TRENTON

water pollution control plant

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations



Water management in Ontario

Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 195
Ontario

Once again we have the privilege of submitting to you our latest detailed report on financial progress and technical activity at your water pollution control plant.

The statistical information contained in this annual operating summary will undoubtedly be a useful barometer of efficiency. Of particular interest will be the comments and recommendations of the regional operations engineer, who was intimately connected with day-to-day operation throughout 1970.

Together with the extensive cost data provided, this information should assist greatly in your general understanding of the problems met and dealt with, and in furnishing a yardstick for possible future expansion.

D. S. Caverly,
General Manager.

D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

CONTENTS

Title page. 1

Flow diagram . . . 2

Design data 3

'70 Review 4

Project costs . . . 6

Process data. . . . 9

TRENTON

water pollution control plant

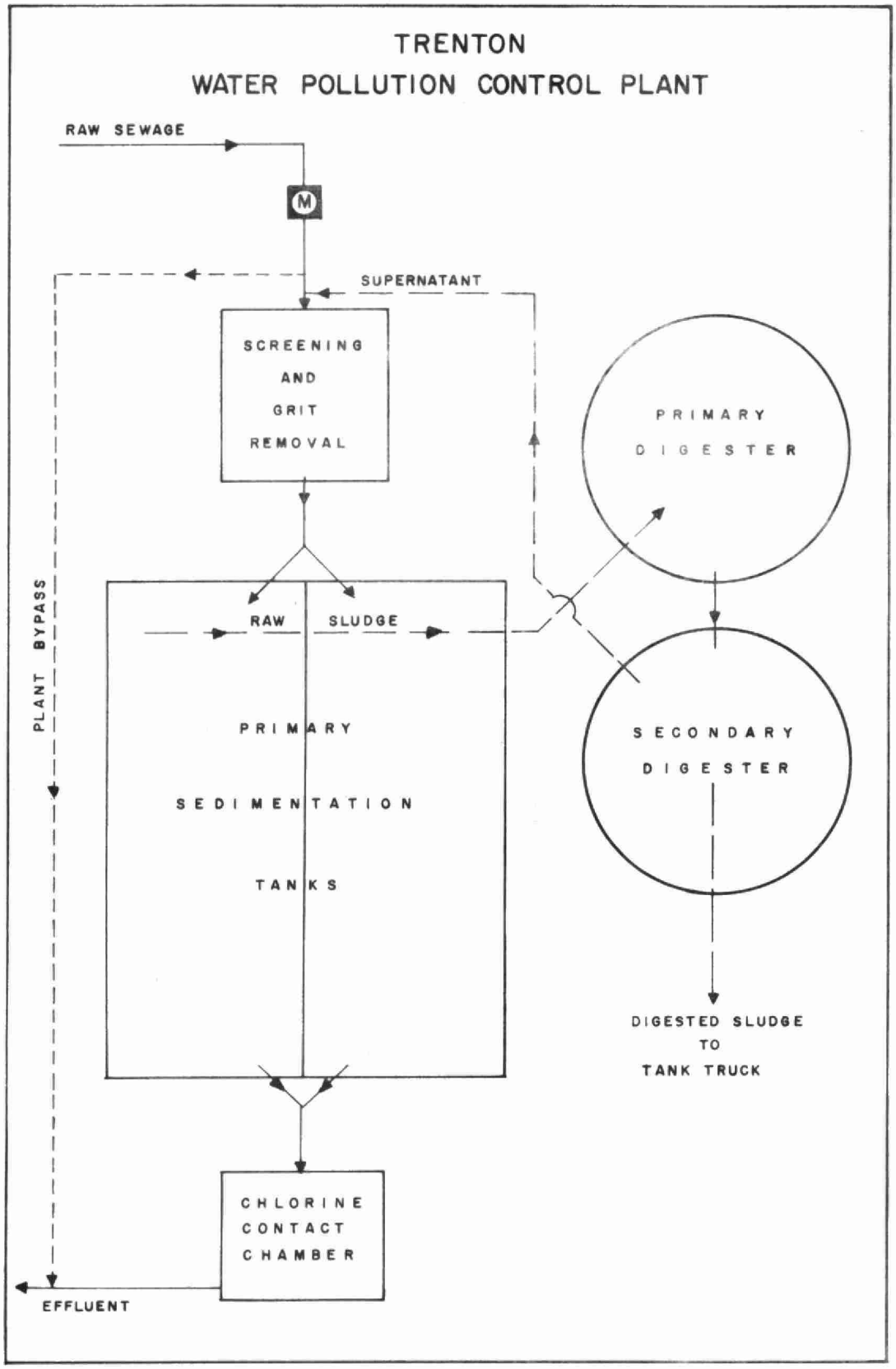
operated for

THE TOWN OF TRENTON

by the

ONTARIO WATER RESOURCES COMMISSION

1970 ANNUAL OPERATING SUMMARY


TRENTON
WATER POLLUTION CONTROL PLANT
RAW SEWAGE
M
SUPERNATANT
SCREENING AND GRIT REMOVAL
PRIMARY DIGESTER
PLANT BYPASS
RAW SLUDGE
PRIMARY SEDIMENTATION TANKS
SECONDARY DIGESTER
DIGESTED SLUDGE TO TANK TRUCK
CHLORINE CONTACT CHAMBER
EFFLUENT

DESIGN DATA

PROJECT NO.	2-0004-57	TREATMENT	Primary
DESIGN FLOW	1.0 mgd	DESIGN POPULATION	12,000
BOD - Raw Sewage	250 mg/l	SS - Raw Sewage	200 mg/l
- Removal	35%	- Removal	55%

PRIMARY TREATMENT

Grit Removal

Type: Aerated, with air lift
Size: One 10' x 9' x 8½' (4,775 gal)
Retention: 1.5 min

Primary Sedimentation

Type: Jeffrey
Size: Two 52' x 16' x 12' (125,000 gal)
Retention: 3.0 hr
Loading: Surface, 600 gal/ft^2/day
Weir, 8340 gal/ft/day

Air Supply

Two Roots-Connersville

CHLORINATION

Type: F & P

Chlorine Contact Chamber

- not provided; chlorination in outfall

OUTFALL

- 850 ft of 30" concrete pipe to Bay of Quinte

SLUDGE HANDLING

Digestion System - Two-stage

Primary --
Type: Gas mixed, fixed cover; PFT
Size: One 28' dia x 23' (13,500 cu ft or 84,000 gal)
Loading: 2.62 lb/cu ft/mo

Secondary --
Type: Fixed cover
Size: One 28' dia x 23' (13,500 cu ft or 84,000 gal)
Total Loading: 1.31 lb/cu ft/mo

PUMPING STATIONS

Dundas Street Pumping Station

Type: Fairbanks-Morse
Size: One 700 gpm @ 39' tdh
One 1740 gpm @ 48' tdh
One 3130 gpm @ 68' tdh (diesel)

'70 REVIEW

GENERAL

The Trenton Water Pollution Control project consists of a 1.0 mgd primary treatment plant, two pumping stations and associated forcemains, and sewers. A design report has been submitted and reviewed for the expansion of the treatment and pumping facilities.

During 1970, a clean-out was performed on the primary and secondary digesters. Minor repairs to the internal piping of the digesters were made at this time. A conveyor belt unit was purchased to facilitate the clean out.

Parts were installed to upgrade the plant flow meter capacity from 5.0 IMGD to 7.0 IMGD. However, problems with the accuracy of the meter persisted throughout the year despite much effort towards correcting the situation.

Major parts were replaced in the raw sludge pump and the sludge transfer pump and new solenoid valves were purchased for the hydraulic sludge valves.

EXPENDITURES

The total operating expenditure for the plant and associated pumping stations was $40,728.00. The budget figure of $33,500 was exceeded because of the decision to chlorinate the plant effluent twelve months of the year instead of the usual six months and because of the overtime payments to plant staff related to the digester cleanouts. This represents a cost of approximately 12 cents per pound of BOD removed.

PLANT FLOWS and CHLORINATION

Modifications to the plant flow meter and persistent problems with the meter accuracy have negated efforts to collect sustained flow records during 1970. However, based on the data available the average daily flow appears to be in the order of 1.69 IMGD. This is 69% in excess of the plant design flow. Because of the noted uncertainty more detailed flow information is not provided.

The total amount of chlorine used to disinfect the effluent was 35, 860 lbs. An average chlorine dosage of 6.8 milligrams per litre was required to obtain a 0.5 mg/l chlorine residual after a 15 minute contact period.

SLUDGE DIGESTION and DISPOSAL

Due to a complete cleanout of the primary digester in March and April and the secondary digester in October, it was not necessary to dispose of sludge during the remaining months. Approximately 26 cubic yards of sludge with an average solids content of 12.3% was hauled before the digester cleanouts. The total amount of sludge disposed of during the year was 1150 cubic yards.

PLANT EFFICIENCY

The average concentrations of BOD and suspended solids in the plant influent were 282 mg/l and 264 mg/l respectively.

The average concentrations of BOD and suspended solids in the plant effluent were 198 mg/l and 121 mg/l respectively. This represented a reduction in BOD and suspended solids of 30% and 54% respectively. This degree of treatment is consistent with that expected from a primary plant. The concentrations of BOD and suspended solids in the plant influent increased by 50% and 18% respectively over the 1969 concentrations.

CONCLUSIONS

The treatment plant and Dundas Street pumping station are hydraulically overloaded. It is expected that final design for the expansion of these facilities will be completed in 1971.

A reasonable reduction in BOD and suspended solids was achieved this year even though continuous overloading was experienced.

The digester clean outs were completed in a minimum amount of time at a very low cost as the sludge was pumped directly to a holding pond and no haulage costs were incurred.

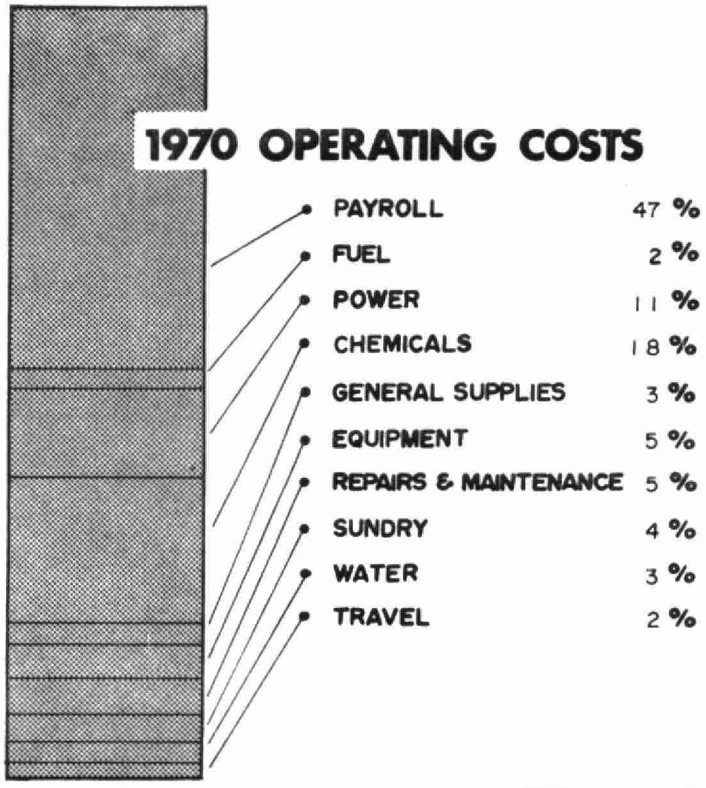
The separated water piping system is being modified in an effort to remove the entrained air from the separated water to improve the accuracy of the flow meter.

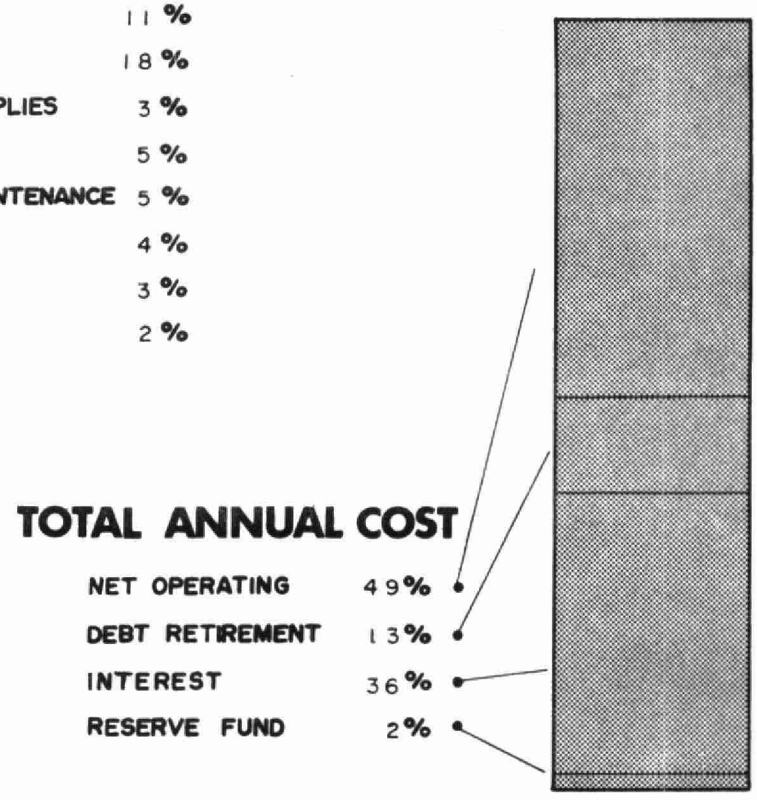
PROJECT COSTS

NET CAPITAL COST (Final)	$515,665.11
DEDUCT - Portion financed by CMHC/MDLB (Final)	-
Long Term Debt to OWRC	$515,665.11
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1970	$157,654.72
Net Operating	$ 39,428.20
Debt Retirement	10,406.00
Reserve	1,769.76
Interest Charged	28,890.76
TOTAL	$ 80,494.72

RESERVE ACCOUNT

Balance @ January 1, 1970	$ 33,257.50
Deposited by Municipality	1,769.76
Interest Earned	2,099.56
	$ 37,126.82
Less Expenditures	3,213.59
Balance @ December 31, 1970	$ 33,913.23





Yearly Operating Costs

YEAR	MILLION GALLONS TREATED	TOTAL OPERATING COSTS	COST PER MILLION GAL	COST PER LB OF BOD REMOVED
1966	233.76	$19,154.53	$81.94	5 cents
1967	405.32	22,513.98	55.55	3 cents
1968	466.88	26,431.57	56.61	4 cents
1969	401.70*	28,799.25	36.84	5 cents
1970	616.9 (est)	40,728.10	66.00	8 cents

MONTHLY OPERATING COSTS

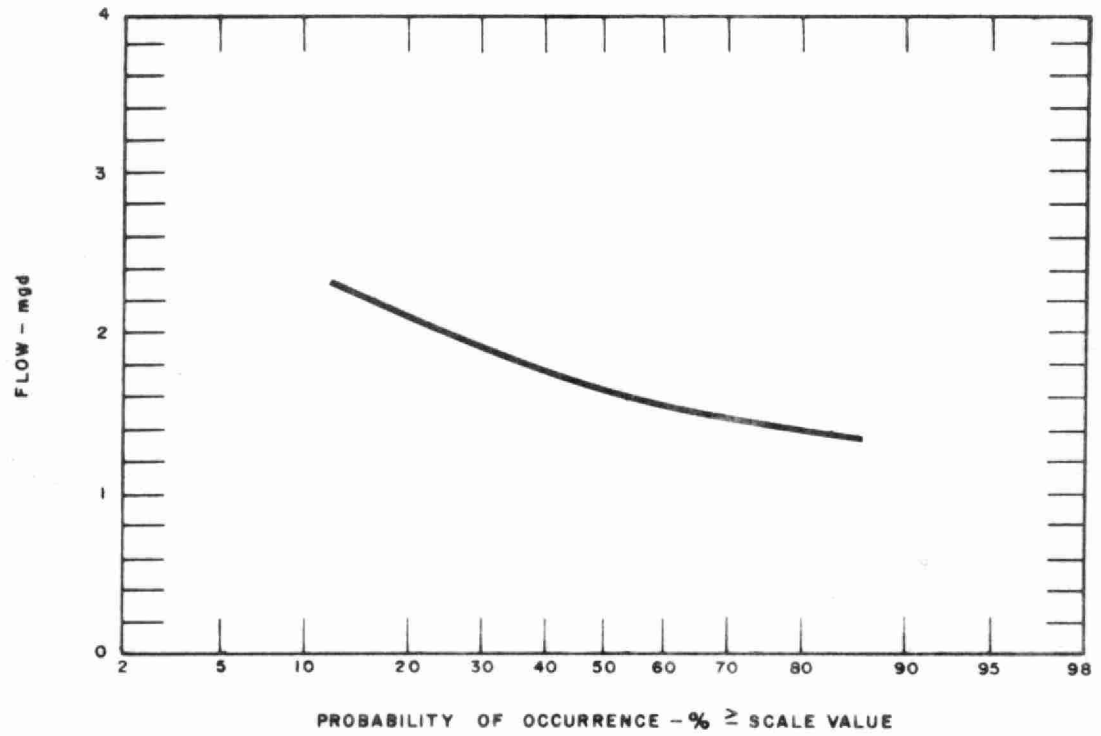
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY *	WATER	TRAVEL
JAN	3110.39	1961.98	-	62.18	339.38	441.00	120.57	-	-	20.50	56.98	107.80
FEB	2221.61	1354.60	-	160.75	429.79	-	126.59	-	-	77.05	-	72.83
MAR	3676.28	1682.78	-	87.92	320.73	882.00	58.70	403.37	115.84	22.67	57.19	45.08
APR	3839.24	2359.62	-	1.50	365.18	176.40	54.27	646.12	100.08	27.20	73.17	35.70
MAY	3121.05	1135.28	-	112.78	348.14	757.58	119.98	40.95	112.98	344.21	96.65	52.50
JUNE	2968.70	1821.21	-	131.51	324.97	-	107.16	-	39.64	257.58	81.69	204.94
JULY	1844.49	474.08	-	78.47	376.50	581.18	65.73	8.20	72.78	79.64	85.98	21.93
AUG	3530.53	2136.16	-	58.67	329.03	726.48	61.16	-	51.50	70.23	97.30	-
SEPT	3641.44	1557.71	-	36.99	303.92	435.89	80.61	202.51	324.60	613.31	85.90	-
OCT	3080.76	1227.96	-	55.36	295.89	1017.07	86.55	60.25	229.81	14.58	93.29	-
NOV	5709.45	2909.71	-	62.07	334.60	1394.83	321.51	230.00	189.41	53.00	141.27	73.05
DEC	3984.16	482.30	-	58.44	910.91	985.96	107.19	266.33	656.92	46.82	173.84	295.45
TOTAL	40728.10	19103.39	-	906.64	4679.04	7398.39	1310.02	1857.73	1893.56	1626.79	1043.26	909.28

BRACKETS INDICATE CREDIT

* SUNDRY INCLUDES SLUDGE HAULAGE COSTS WHICH WERE

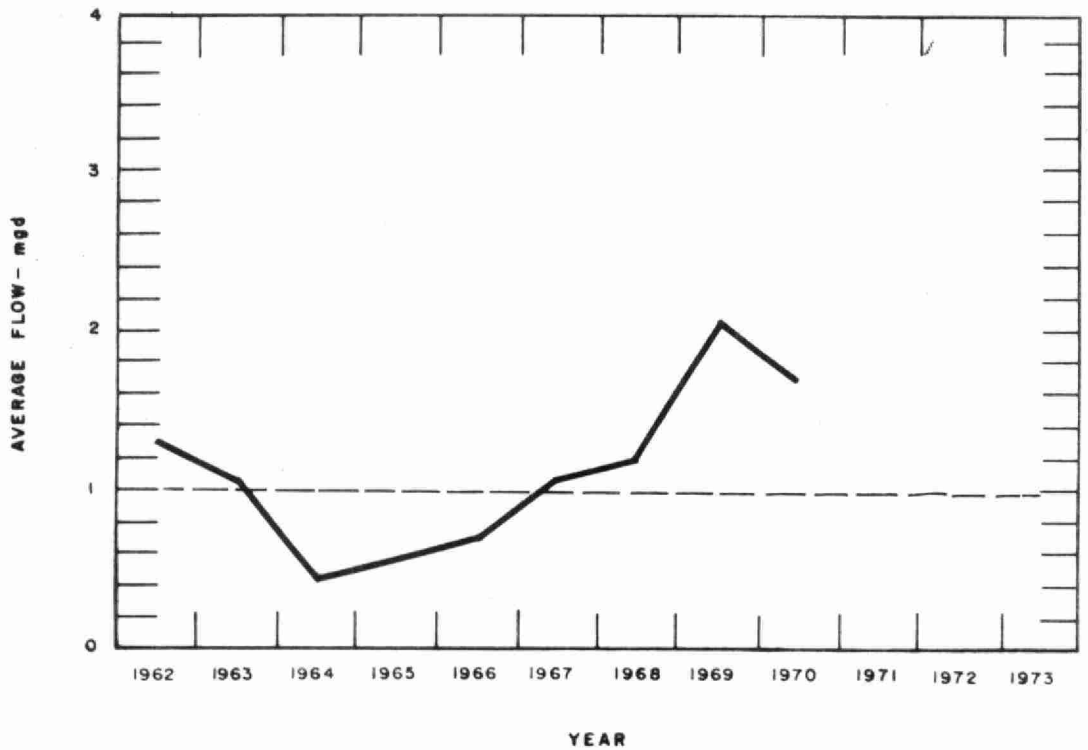
Note: Total does not include year-end adjustments.

PROCESS DATA



FLOWS

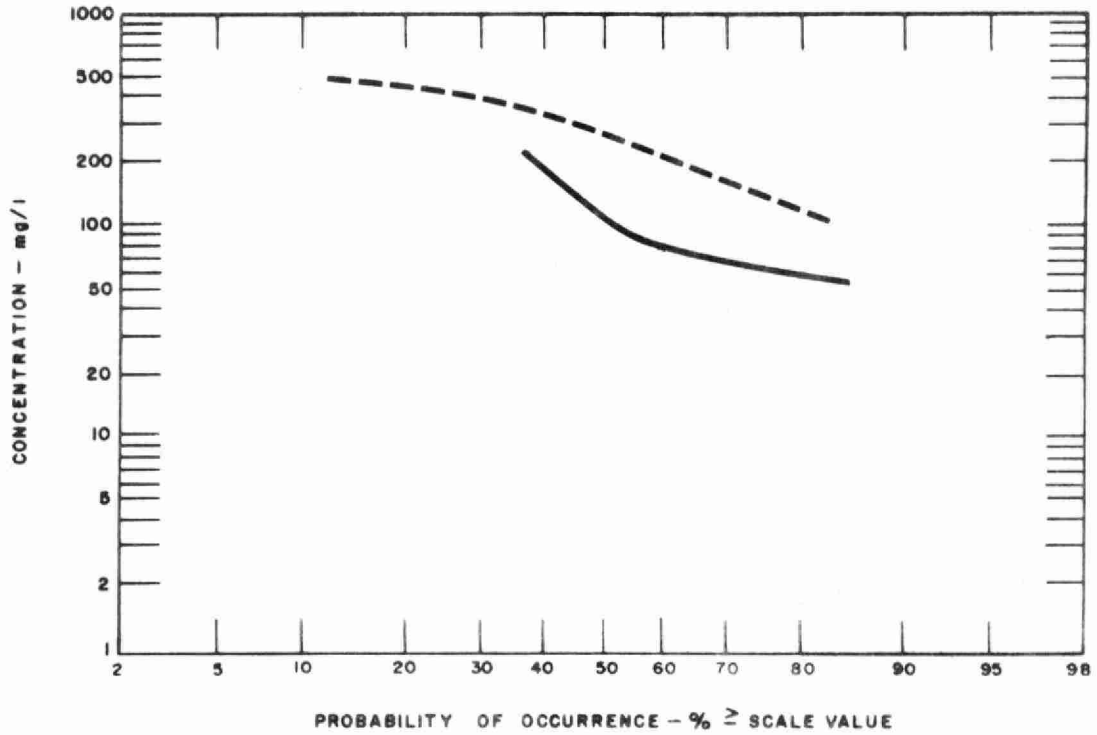
NOMINAL CAPACITY ——— ——— ———



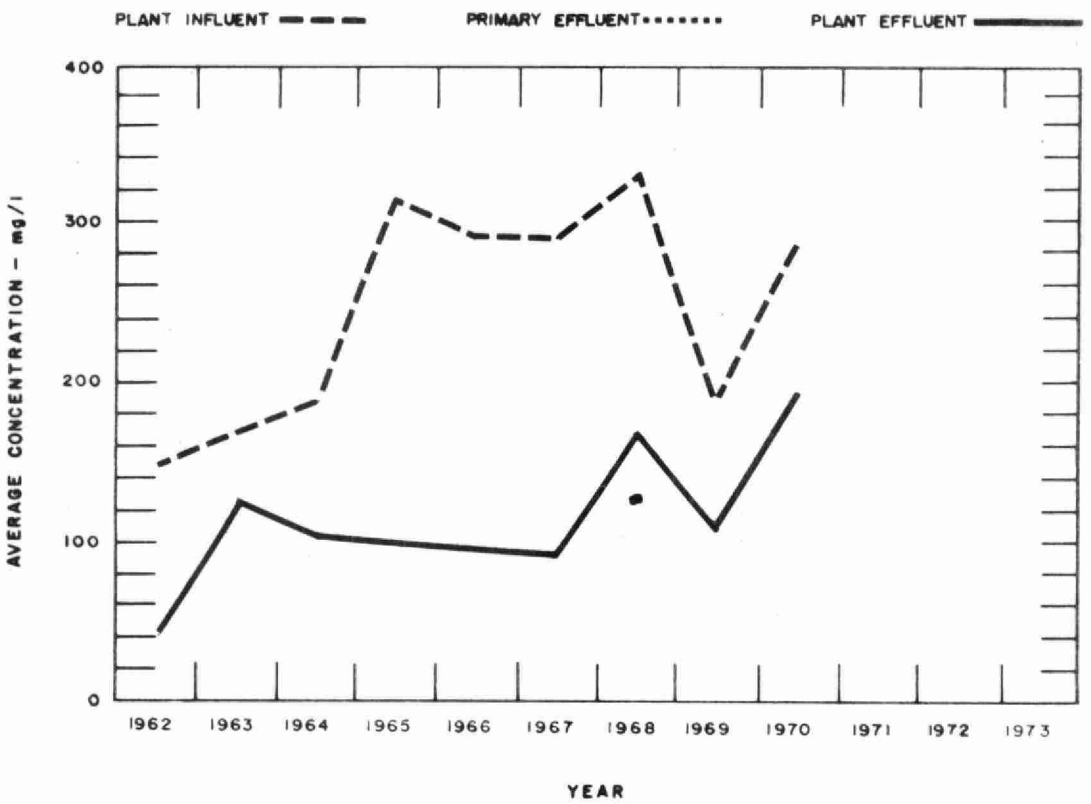
PLANT FLOWS and CHLORINATION

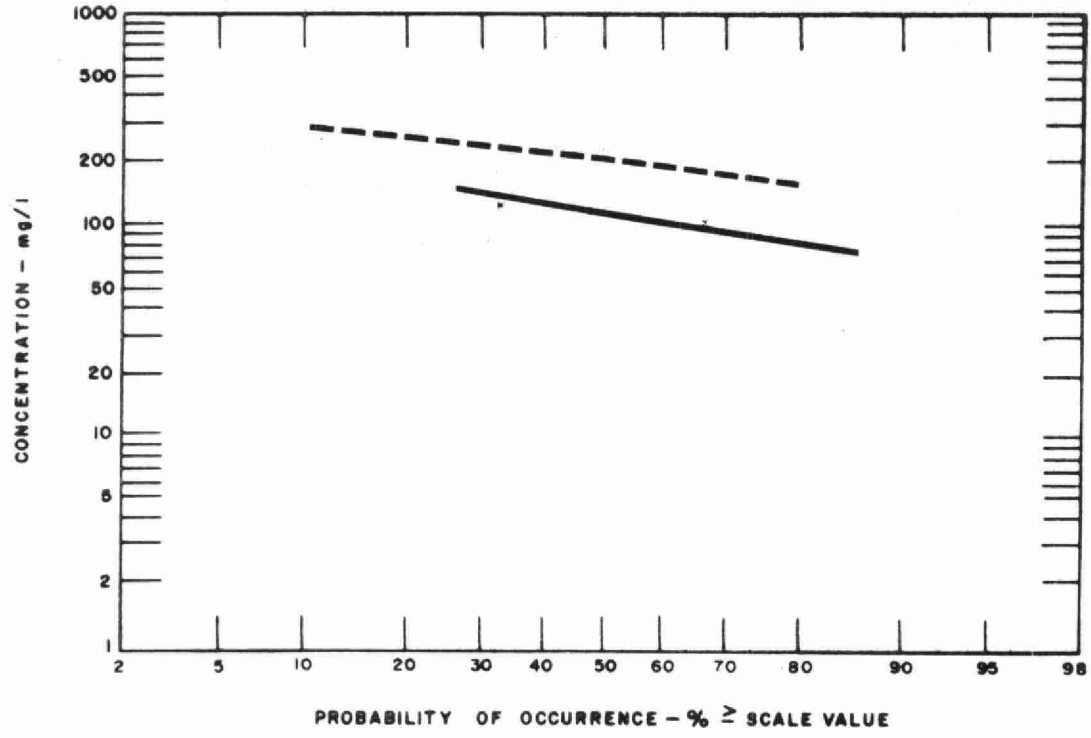
MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal	CHLORINE USED 10^3 pounds	DOSAGE mg/l
JAN	o/s	-	-	-	2.98	-
FEB	o/s	-	-	-	3.00	-
MAR	o/s	-	-	-	3.16	-
APR	46.6(a)	1.94	4.5	1.4	2.97	6.0
MAY	51.7	1.67	2.4	1.3	3.10	6.0
JUNE	49.6	1.65	2.3	1.3	3.23	6.5
JULY	50.0	1.60	2.5	1.3	3.59	7.2
AUG	40.6	1.37	1.9	1.1	3.52	8.7
SEPT	3.5(b)	1.15	1.4	1.0	3.18	9.2
OCT	28.3(c)	1.73	2.7	1.2	3.40	6.3
NOV	67.4(d)	2.23	3.8	1.5	3.49	5.2
DEC	57.5	1.83	3.1	1.0	3.47	6.0
TOTAL	-	-	-	-	35.86	-
AVERAGE	-	1.69	-	-	-	9.0

Flow records available for
(a) 24 days
(b) 6 days
(c) 21 days
(d) 29 days

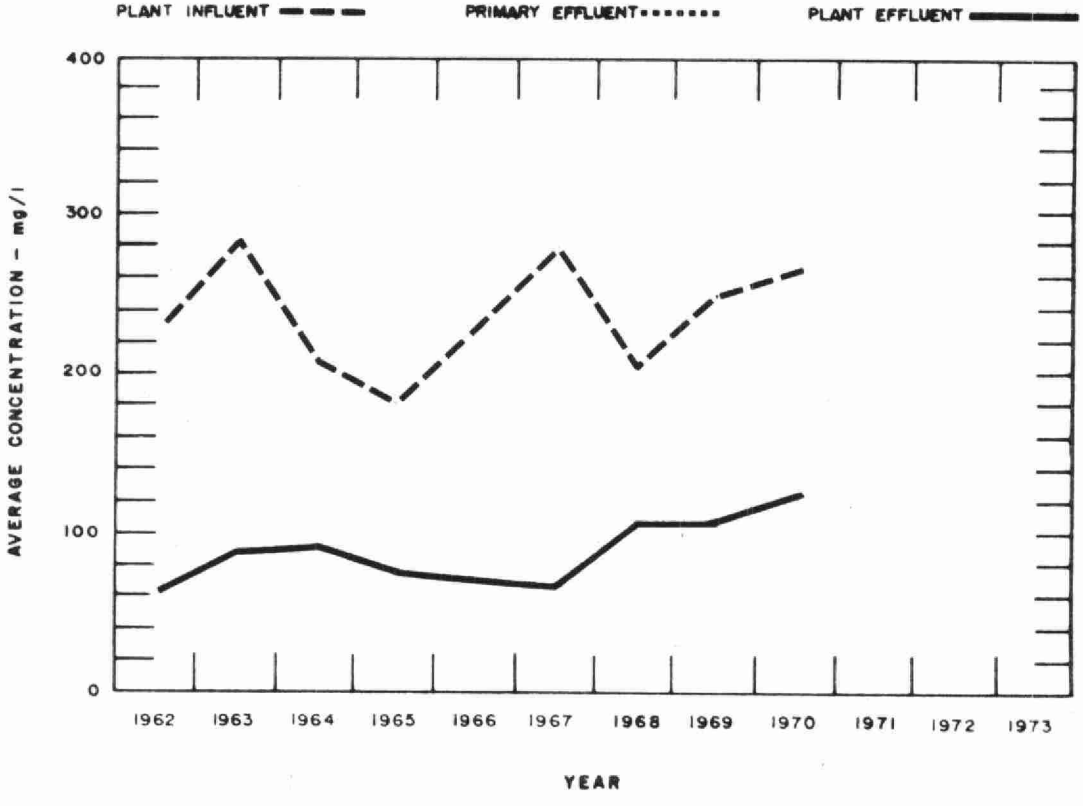


BIOCHEMICAL OXYGEN DEMAND





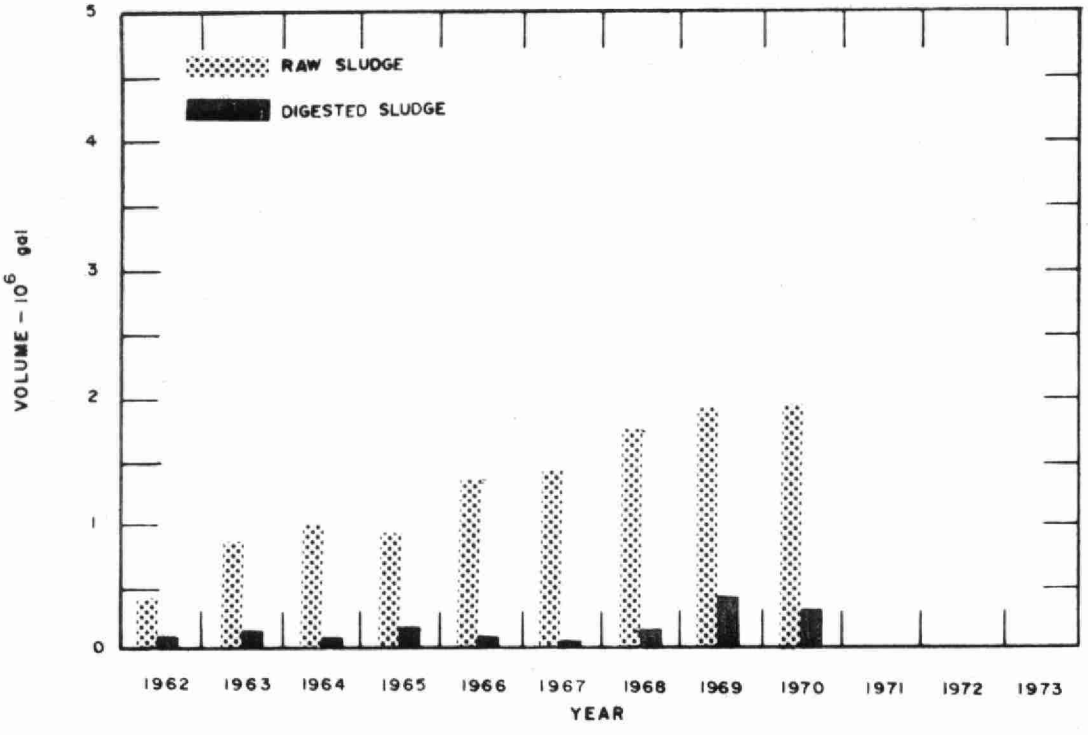
SUSPENDED SOLIDS



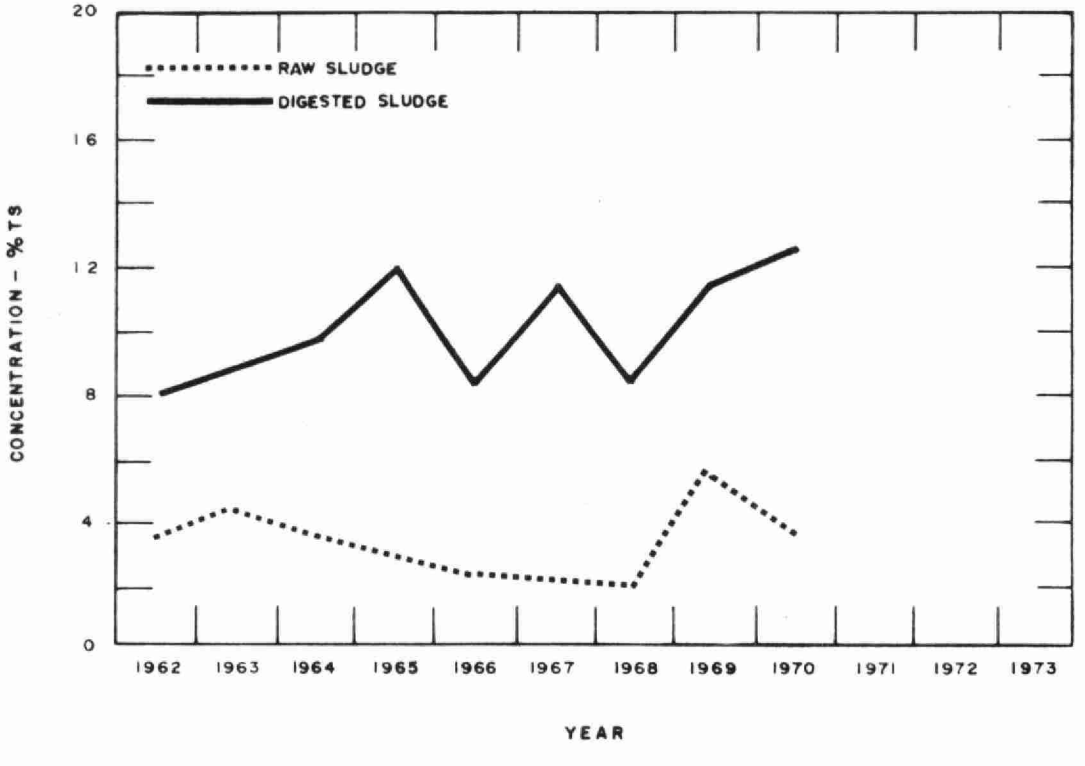
PLANT EFFICIENCY

MONTH	BIOCHEMICAL OXYGEN DEMAND						SUSPENDED SOLIDS						GRIT REMOVED
	INFLUENT		EFFLUENT		REDUCTION		INFLUENT		EFFLUENT		REDUCTION		
	n	mg/l	n	mg/l	%	10^3 pounds	n	mg/l	n	mg/l	%	10^3 pounds	cu ft
JAN	1	120	1	70	42	-	2	205	2	90	56	-	6
FEB	1	21	1	4	80	-	1	30	1	5	83	-	-
MAR	-	-	-	-	-	-	-	-	-	-	-	-	-
APR	1	150	1	80	47	-	1	330	1	100	70	-	-
MAY	1	130	-	-	-	-	1	280	-	-	-	-	-
JUNE	2	290	2	230	21	30	2	222	2	132	41	44	-
JULY	2	390	2	245	39	72	2	230	2	115	42	57	105
AUG	1	420	2	240	24	73	1	240	1	100	58	57	-
SEPT	1	200	1	190	5	-	1	1230	1	410	67	-	-
OCT	3	373	3	247	41	-	3	217	3	107	41	-	-
NOV	3	257	3	163	37	-	3	173	3	107	38	-	-
DEC	2	390	2	280	28	63	2	210	2	120	28	52	-
TOTAL	18	-	18	-	-	-	19	-	18	-	-	-	111
AVERAGE	-	282	-	198	30	60	-	264	-	121	54	53	-

NOTE – n is the number of samples taken


RAW SLUDGE
DIGESTED SLUDGE
VOLUME - 10^6 gal
0
1
2
3
4
5
1962
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
YEAR

DIGESTION


RAW SLUDGE
DIGESTED SLUDGE
CONCENTRATION - % TS
0
4
8
12
16
20
1962
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
YEAR

SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
	VOLUME 10^3 gal	TOTAL SOLIDS %	VOL SOLIDS %	VOLUME 10^3 gal	TOTAL SOLIDS %	VOL SOLIDS %	VOLUME 10^3 gal	TOTAL SOLIDS %	DEWATERED cu yd	LIQUID cu yd
JAN	160	2.4	68	0	14.8	-	160	.4	0	0
FEB	150	.9	89	0	17.4	47	150	.3	0	0
MAR	160	0	0	*	0	0	160	0	0	0
APR	160	0	0	26	0	0	120	0	0	156
MAY	160	5.3	69	0	0	0	160	.7	0	0
JUNE	160	2.7	0	0	9.4	0	160	.7	0	0
JULY	160	0	0	0	0	0	160	0	0	0
AUG	160	7.5	59	0	7.6	50	160	.3	0	0
SEPT	160	0	0	0	0	0	160	0	0	0
OCT	160	0	0	*	0	0	160	0	0	0
NOV	180	0	0	0	0	0	180	0	0	0
DEC	190	0	0	0	0	0	190	0	0	0
TOTAL	1960	0	0	194	0	0	1920	0	0	1150
AVERAGE	-	3.8	71	-	12.3	48	-	.5	0	-

* Digester emptied - 168,000 gallons

Water management in Ontario